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Imformation recording/reproducing unit, its recording/reproducing method and transmitting media

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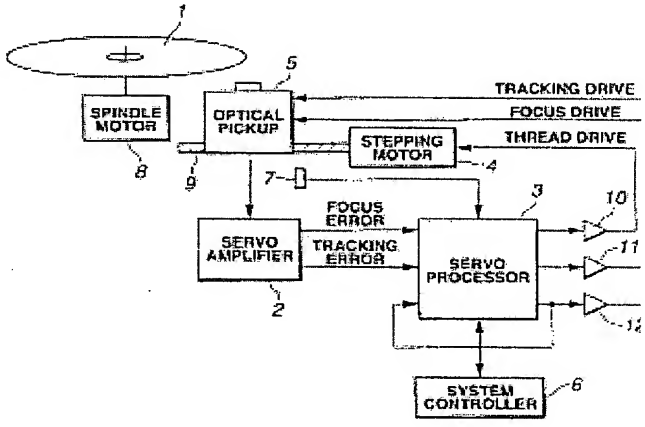
An information recording/reproduction apparatus is adapted to quickly move the optical pickup to a desired position on the optical disk being used with it without emitting any sound of collision. The information recording/reproduction apparatus adapted to use an optical disk comprises an optical pickup 5 supported by a lead screw 9 so to move freely at least in a radial direction of the optical disk 1, a thread motor 4 for driving the optical pickup 5 to move by the distance specified by a drive signal in the radial direction of the optical disk 1, a position detecting switch 7 for detecting the innermost movable limit of the optical pickup 5 in the radial direction of the optical disk 1 and a system controller 6 for controlling the movement of the optical pickup 5 by means of the drive signal applied to the thread motor 4, using the detected position as reference.



Imformation recording/reproducing unit, its recording/reproducing method and transmitting media

Description of corresponding document: **US6445649**

BACKGROUND OF THE INVENTION

[0002] 1. Field of the Invention

[0003] This invention relates to an information recording/reproduction apparatus and an information recording/reproduction method as well as to a transmission medium. More particularly, it relates to an information recording/reproduction apparatus and an information recording/reproduction method adapted to control the position of the recording/reproduction position of the apparatus by means of the number of pulses output to the stepping motor thereof as well as to a transmission medium adapted to be used with such an apparatus and/or such a method

[0004] 2. Prior Art

[0005] Information recording/reproducing apparatus adapted to record information on or reproduce information from an optical disk by irradiating it with a laser beam from an optical pickup are known.

[0006] Known information recording/reproduction apparatus record information or reproduce information from an optical disk by referring to a reference position where the optical pickup can access a lead area. In the information recording/reproduction apparatus, the optical pickup is moved to that position by causing it to move to the innermost periphery of the optical disk, detecting the optical pickup by means of a detection switch fitted to the innermost periphery of the optical disk and subsequently moving the optical pickup toward the outer periphery of the optical disk by a predefined quantity.

[0007] It is necessary for the information recording/reproduction apparatus to move the optical pickup to a predetermined position in order not to prevent the information on a so-called CD-R optical disk from being destroyed by heat produced by the laser beam when determining the type of the optical disk to be operating with it. Additionally, it is necessary for the information recording/reproduction apparatus to move the optical pickup in order to output any tracking error without fail when regulating the tracking balance.

[0008] However, since known information recording/reproduction apparatus are not adapted to control the position of the optical pickup, it is necessary to firstly move the optical pickup to the innermost periphery of the optical disk each time the optical pickup is moved to the reference position where it can access the lead area. Then, each time the optical pickup is moved to the innermost periphery of the optical disk, the stepping motor driving the optical pickup becomes out of step and emits a sound of collision. This known method is accompanied by an additional problem that the process of moving the optical pickup from the innermost periphery of the optical disk toward the outer periphery thereof is time consuming. Still additionally, an information recording/reproduction apparatus comprising an optical pickup that emits such a sound of collision is not "decent" and it is not pleasant for the user to hear such a noise.

[0009] On the other hand, it is necessary to move the optical pickup to a predetermined position in order to determine the type of the optical disk and regulate the tracking balance. Since known information recording/reproduction apparatus are not adapted to control the position of the optical pickup, it is necessary to issue a command to the servo controller to make the system controller move the optical pickup anew after the completion of the operation of determining the type of the optical disk and regulating the tracking balance. This process is rather cumbersome and time consuming.

[0010] In view of the above identified problems, it is therefore the object of the present invention to provide an information recording/reproduction apparatus and an information recording/reproduction method that are adapted to quickly move the optical pickup to a desired position on the optical disk being used with it without emitting any sound of collision even after the completion of the operation of determining the type of the optical disk and regulating the tracking balance. Another object of the present invention is to provide a transmission medium adapted to be used with such an apparatus and/or such a method.

BRIEF SUMMARY OF THE INVENTION

[0011] According to the invention, the above objects are achieved by providing an information recording/reproduction apparatus comprising a head supported by a support member so to move in a radial direction of the disk being used with it in order to record information on or reproduce information from the disk, said apparatus being adapted to move the head by a predetermined distance in a radial direction of the disk to a first position by means of a drive signal, detecting the first position of the head in terms of the radial direction of the head by means of a position detecting means and controlling the movement of the head by means of the drive signal, using the first position detected by the position detecting means as reference.

[0012] Thus, according to the invention, the optical pickup is required to be moved to the innermost periphery of the optical disk only once at the time of initialization of the apparatus in order to define a reference point for the movement of the optical pickup. Thereafter, it is no longer necessary to move the optical pickup to the innermost periphery. Thus, the time required for the optical pickup to be moved to the reference position can be minimized and the sound of collision emitted when the optical pickup is moved

to the innermost periphery of the optical disk is eliminated.

BRIEF DESCRIPTION OF THE DRAWINGS

[0013] FIG. 1 is a schematic block diagram of an information recording/reproduction apparatus according to the invention.

[0014] FIG. 2 is a flow chart of the processing operation of leading the optical pickup to the reference position.

[0015] FIG. 3. Is a flow chart of the processing operation of determining the type of the optical disk.

[0016] FIG. 4 is a flow chart of the processing operation of regulating the tracking balance of the optical disk.

DETAILED DESCRIPTION OF THE INVENTION

[0017] Now, a preferred mode of carrying out the invention will be described in detail for an information recording/reproduction apparatus, an information recording/reproduction method and a transmission medium according to the invention.

[0018] As shown in FIG. 1, an information recording/reproduction apparatus according to the invention and using an optical disk comprises a spindle motor 8 for driving the optical disk 1 at a predetermined rate, an optical pickup 5 for recording information on or reproducing information from the optical disk 1 by irradiating it with the laser beam emitted from a built-in laser diode by way of an objective lens, a lead screw 9 supporting the optical pickup 5 so as to keep it movable in a radial direction of the optical disk 1, a thread motor 4 for moving the optical pickup 5 in a radial direction of the optical disk along the lead screw 9 and an innermost periphery detecting switch 7 for detecting the optical pickup 5 located at the innermost periphery of the optical disk 1. The thread motor 5 is a stepping motor.

[0019] The information recording/reproduction apparatus using an optical disk further comprises a servo amplifier 2 for generating a focus error signal and a tracking error signal from the signal output from the optical pickup 7, a servo processor 3 for generating a focus control signal, a tracking control signal and a thread control signal from the focus error signal and the tracking error signal from the servo amplifier 2 and a focus driver 11, a tracking drive 12 and a thread driver 12 for respectively generating a focus drive signal, a tracking drive signal and a thread drive signal from the focus control signal, the tracking control signal and the thread control signal from the servo processor 3 along with a system controller 6 for controlling the different components of the information recording/reproduction apparatus using an optical disk.

[0020] Now, the operation of the information recording/reproduction apparatus using an optical disk will be discussed below. The signal read by the optical pickup 5 is input to the servo amplifier 2. The signal is amplified by the servo amplifier 2, which generates a focus error signal and a tracking error signal. The generated focus error signal and the tracking error signal are then input to the servo processor 3. The servo processor 3 processes the input signals and outputs a focus drive signal, tracking drive signal and a thread drive signal. The tracking error signal output from the servo processor 3 is also fed back to the servo processor.

[0021] The focus drive signal, the tracking drive signal and the thread drive signal are then used to drive respectively a focus actuator for driving the objective lens of the optical pickup in the focussing direction, a tracking actuator for driving the objective lens in the tracking direction and the thread motor 4 for driving the optical pickup in the radial direction of the optical disk 1 along the lead screw 9.

[0022] The stepping motor 4 moves the optical pickup 5 by way of the lead screw. The optical disk 1 is driven to rotate by the spindle motor 8. The number of revolutions of the stepping motor 4 is determined by the pulse signal of the drive signal. Thus, the stepping motor drives the optical pickup 5 to move by a distance defined by the drive signal.

[0023] The innermost periphery detecting switch 7 arranged at the innermost periphery of the thread drive mechanism for driving the optical disk 1 in a radial direction by means of the lead screw 5 detects the optical pickup 5 located at the inner periphery of the optical disk 1 and the detection signal is input to the servo processor 3. The system controller 3 realizes this operation of driving the optical pickup 5 by sending a command to the servo processor 3 that may cause the optical pickup 5 to move toward the inner periphery of the optical disk 1 by N steps or toward the outer periphery of the optical disk 1 by N steps, where N is a natural number.

[0024] When the information recording/reproduction apparatus using an optical disk is initialized, the system controller 6 controls the optical pickup 5 so as to move it to the innermost periphery of the optical disk 1. At this time, servo processor 3 recognizes that the optical pickup 5 is located at the innermost periphery of the optical disk 1 by way of the innermost periphery detecting switch 7 operating as position detecting means and stops the thread motor 4 to make the optical pickup 5 to be accurately located there. Thus, the innermost periphery detecting switch 7 is used as position detecting means for detecting the optical pickup 5 located at the first position that defines the innermost movable limit of the optical pickup 5 in the radial direction of the optical disk 1.

[0025] The optical disk 1 has a lead-in area located near the inner periphery thereof. Before the optical pickup 5 initially accesses the optical disk 1, it has to be moved to a reference position from which it can access the lead-in area. Thus, the second position from which the optical pickup 5 can access the lead-in

area is referred to as reference position.

[0026] The servo processor 3 drives the thread motor 4 by outputting a pulse signal to the latter. Thus, the servo processor 3 can specify the position of the optical pickup 5 by counting the number of pulses of the pulse signal. Then, the system controller 6 can recognize the position of the optical pickup by reading the positional information on the optical pickup 5 from the servo processor 3.

[0027] Since the system controller 6 recognizes the first position of the optical pickup 5 as described above, it can move the optical pickup 5 to the second position, or the reference position, without firstly moving it to the innermost periphery of the optical disk 1. More specifically, as seen from the flow chart of FIG. 2, the system controller 6 reads the information on the current position of the optical pickup 5 from the servo processor 3 in Step S11. Then, the system controller 6 computationally determines the distance between the current position of the optical pickup 5 and the reference position in Step S12. Thereafter, the system controller 6 sends a command to the servo processor 3 that causes the optical pickup 5 to move by the determined distance. Thus, the system controller 6 can move the optical pickup 5 to the reference position without firstly moving it to the innermost periphery of the optical disk 1.

[0028] The information recording/reproduction apparatus using an optical disk 1 has to determine the type of the optical disk, which may be a CD or a DVD. This operation of determining the disk type is referred to disk type determination. The operation of disk type determination is carried out by following the procedure shown in the flow chart of FIG. 3. Referring to FIG. 3, the system controller 3 firstly controls the servo processor 3 to make the latter store the position of the optical pickup 5 in Step S21. When determining the type of the optical disk, the servo processor 3 is used in stead of the above described innermost periphery detecting switch 7 as means for detecting the first position, or the current position of the optical pickup 5, in the radial direction of the optical disk 5.

[0029] Then, in Step S22, the system controller 6 issues a command to the servo processor 3 to cause the latter to move the optical pickup 5. Then, in Step S23, the system controller 6 turns on the laser diode provided on the optical pickup 5 and makes it to carry out a focus searching operation on the optical disk 1 in order to determine the type of the optical disk 1. Then, in Step S24, the system controller 6 issues a command to the servo processor 3 to cause the latter to return the optical pickup 5 to the position before the focus searching operation.

[0030] If it is determined as a result of the focus searching operation of Step S23 that the optical disk 1 is a recordable CD-R, the information stored on the spot irradiated by the laser beam can be destroyed by heat. Thus, the system controller 6 drives the optical pickup 5 to retire by means of a thread transfer mechanism comprising the thread motor 7 and the lead screw 9 and adapted to move the optical pickup 5 in the radial direction of the optical disk 1. With this arrangement, the heat produced by the laser beam irradiating the optical disk 1 can be dispersed to prevent any information on the optical disk 1 from being destroyed by heat.

[0031] The regulating operation of applying an offset voltage to the tracking control signal in such a way that the tracking error signal representing the displacement of the focal point of the laser beam from the target recording track formed on the information recording surface of the optical disk may oscillate from a center voltage under the condition where the focus servo is activated and the laser beam emitted from the optical pickup 5 is focussed on the information recording surface is referred to as tracking balance regulation.

[0032] For tracking balance regulation, it is necessary to move the optical pickup 5 by means of the thread transfer mechanism in such a way that a tracking error signal is generated without fail even if the optical disk is an eccentricity-free disk. The operation of tracking balance regulation is carried out by following the procedure shown in the flow chart of FIG. 4. Referring to FIG. 4, the system controller 3 firstly controls the servo processor 3 to make the latter store the position of the optical pickup 5 in Step S31. When regulating the tracking balance, the servo processor 3 is used in stead of the above described innermost periphery detecting switch 7 as means for detecting the first position, or the current position of the optical pickup 5, in the radial direction of the optical disk 5 as described above by referring to the operation of determining the disk type.

[0033] Then, in Step S32, the system controller 6 issues a command to the servo processor 3 to cause the latter to move the optical pickup 5. Then, in Step S33, the system controller 6 controls the operation of tracking balance regulation to be carried out properly. Then, in Step S34, the system controller 6 issues a command to the servo processor 3 to cause the latter to move the optical pickup 5 to the position for tracking balance regulation.

[0034] Now, an embodiment of transmission medium according to the invention will be described below. A transmission recording medium is a medium adapted to transmit an information recording/reproduction processing program for recording information on or reproducing information from a disk by means of a head supported by a support member so to move it freely at least in a radial direction of the disk, said information recording/reproduction processing program including a drive processing for moving the head in the radial direction of the head by the distance defined by a drive signal, a positional detection processing for detecting the first position of the head in the radial direction of the disk and a control processing for controlling the movement of the head by means of the drive signal used for the above drive processing, employing the first position detected by the positional detection processing as reference position.

[0035] The transmission medium may be a recording medium such as a CD-ROM that is a magnetic disk or a solid memory or a communication medium such as a network or a communication satellite.

[0036] As described above, the embodiment of the present invention comprises a thread transfer mechanism that is driven by a stepping motor 4 and controls the position of the optical pickup 5 by means of the number of pulses of the pulse signal output to the stepping motor.

[0037] Thus, the embodiment computationally determines the distance between the current position of the optical pickup 5 and the innermost periphery of the optical disk 1 by using the information obtained for the current position and stops the optical pickup 5 at a position in the lead-in area.

[0038] The embodiment also detects the position of the optical pickup 5 when the latter starts moving and detects the distance of movement of the optical pickup 5 from the position thereof obtained when the determining operation or the regulating operation is terminated. Then, the embodiment returns the optical pickup 5 to the original position by moving it back by the detected distance.

[0039] It may be understood that the embodiment can also be used to move the optical pickup 5 to an arbitrarily selected position by using the thread transfer mechanism driven by the stepping motor 4 and counting the number of pulses of the pulse signal output from the stepping motor 4.

[0040] While the head of an information recording/reproduction apparatus is an optical pickup 5 in the above embodiment, the head actually includes an objective lens provided in the optical pickup 5. Since the position at which the laser beam is focussed on the optical disk 1 is defined by the optical pickup 5 and the objective lens, the information recording/reproduction apparatus moves the position under control.

Imformation recording/reproducing unit, its recording/reproducing method and transmitting media

Claims of corresponding document: **US6445649**

What is claimed is:

[0041] 1. An information recording/reproduction apparatus for recording information on and reproducing information from a disk, said apparatus comprising:a head supported by a support member so to move in a radial direction of said disk; a drive means for driving said head to move a distance in the radial direction of the disk in accordance with a drive signal; a position detection means for detecting a first position of said head in the radial direction of said disk, wherein said first position detected by said position detection means in an innermost movable limit of said head in the radial direction of said optical disk; and a control means for controlling the movement of said head by means of the drive signal applied to said drive means, using the first position detected by said position detection means as reference and said control means controls said drive means so as to cause it to move said head to the second position, wherein said second position is a reference position from which said head can access a lead-in area located near an inner periphery of said disk, wherein when said information recording/reproduction apparatus is initialized, said control means controls movement of said head to the innermost periphery of said disk and recognizes said head is located at said first position by way of a position detection operation, and when the head starts moving, said control means controls movement of said head to said second position when a determining operation or a regulating operation is terminated without firstly moving said head to said first position.

[0042] 2. An information recording/reproduction apparatus according to claim 1, whereinsaid drive means includes a stepping motor whose number of rotary steps is specified by a pulse signal and said control means controls said drive means by using the pulse signal as a drive signal.

[0043] 3. An information recording/reproduction apparatus according to claim 2, whereinthe first position detected by said position detection means is the innermost movable limit of said head in the radial direction of said optical disk.

[0044] 4. An information recording/reproduction apparatus according to claim 1, whereinsaid control means controls the movement of said head to the first position by using the first position detected by said position detection means as reference.

[0045] 5. An information recording/reproduction apparatus according to claim 1, whereinsaid drive means includes a stepping motor whose number of rotary steps is specified by a pulse signal and said control means controls said drive means by using the pulse signal as drive signal.

[0046] 6. An information recording/reproduction apparatus according to claim 1, whereinsaid control means controls said drive means by a drive signal so as to move said head to the target track of the recording tracks formed on said disk, using said first position as reference.

[0047] 7. An information recording/reproduction method for recording information on and reproducing information from a disk by means of a head supported by a support member so to move in a radial direction of said disk, said method comprising steps of:driving said head to move a distance in the radial direction of the disk in accordance with a drive signal; detecting a first position of said head in the radial direction of said disk; and controlling the movement of said head by means of the drive signal applied to a drive means, using the first position detected by said position detection means as a reference and said controlling step controls said driving step so as to move said head to the second position, wherein said second position is a reference position from which said head can access a lead-in area located near an inner periphery of said disk, wherein when said information recording/reproduction apparatus is initialized, said controlling step controls movement of said head to the innermost periphery of said disk and recognizes said head is located at said first position by way of a position detection operation, and when the head starts moving, said controlling step controls movement of said head to said second position when a determining operation or a regulating operation is terminated without firstly moving said head to said first position.

[0048] 8. A transmission recording medium is adapted to transmit an information recording/reproduction processing program for recording information on or reproducing information from a disk by means of a head supported by a support member so to move it in a radial direction of the disk, said information recording/reproduction processing program including:a drive processing for moving the head a distance in

the radial direction of the disk in accordance with a drive signal; a position detection processing for detecting the first position of the head in the radial direction of the disk; and a control processing for controlling the movement of the head by means of the drive signal used for the above drive processing, employing the first position detected by the positional detection processing as a reference position and said control processing controls said drive processing to move the head to a second position, wherein the second position is a reference position from which the head can access a lead-in area located near an inner periphery of said disk, wherein when said information recording/reproduction apparatus is initialized, said control processing controls movement of the head to the innermost periphery of said disk and recognizes the head is located at the first position by way of a position detection operation, and when the head starts moving, said control processing controls movement of the head to the second position when a determining operation or a regulating operation is terminated without firstly moving the head to the first position.

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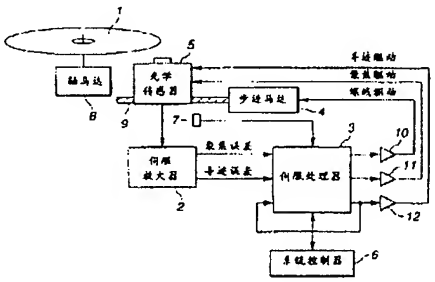
权利要求书2页 说明书7页 附图页数3页

[54]发明名称 信息记录/再现装置与信息记录/再现方法以及传输媒体

[57]摘要

信息记录/再现装置适合于快速地将光学传感器移到所用光盘上的所需位置，而不发出任何碰撞声。适合于使用光盘的信息记录/再现装置包括：由螺杆9支撑以便至少在光盘1的径向自由移动的光学传感器5；驱动光学传感器5在光盘1的径向移动一段由驱动信号确定的距离的螺线马达4；检测在光盘1的径向光学传感器5可移动的最内极限的位置检测开关7；和通过施加在螺线马达4上的驱动信号、利用所检测位置作为参考控制光学传感器5的移动的系统控制器6。



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权 利 要 求 书

1. 一种用于在盘上记录信息和从盘上再现信息的信息记录/再现装置，其特征在于所述装置包括:

由支撑部件支撑以便在所述盘的径向移动的读写头;

驱动装置，用于根据驱动信号将所述读写头在所述盘的径向上移动一段距离;

位置检测装置，用于检测所述读写头在所述盘的径向上的第一位置; 以及

控制装置，用于通过施加在所述驱动装置上的所述驱动信号、利用所述位置检测装置检测到的所述第一位置作为参考来控制所述读写头的移动。

2. 根据权利要求 1 的信息记录/再现装置，其特征在于: 所述控制装置控制所述驱动装置，以便使之利用所述位置检测装置所检测到的第一位置作为参考将所述读写头移到第二位置。

3. 根据权利要求 2 的信息记录/再现装置，其特征在于: 所述位置检测装置所检测到的第一位置是所述读写头在所述光盘的径向上可移动的最内极限。

4. 根据权利要求 1 的信息记录/再现装置，其特征在于: 所述控制装置利用所述位置检测装置所检测到的第一位置作为参考，控制所述读写头移动到所述第一位置，

5. 根据权利要求 1 的信息记录/再现装置，其特征在于: 所述驱动装置包括其转动步数由脉冲信号确定的步进马达，并且所述控制装置利用所述脉冲信号作为驱动信号来控制所述驱动装置。

6. 根据权利要求 1 的信息记录/再现装置，其特征在于: 所述控制装置通过驱动信号控制所述驱动装置，以便利用所述第一位置作为参考、将所述读写头移到形成于所述盘上的记录纹迹中的目标纹迹。

7. 用于通过由支撑部件支撑以便在所述盘的径向移动的读写

头，在盘上记录信息和从盘上再现信息的信息记录/再现方法，其特征在于所述方法包括以下步骤:

根据驱动信号驱动所述读写头在盘的径向上移动一段距离;

检测所述读写头在所述盘的径向上的第一位置；以及

通过施加在所述驱动装置上的驱动信号、利用所述位置检测装置检测到的第一位置作为参考来控制所述读写头的移动。

8. 一种传输记录媒体适合于传输信息记录/再现处理程序，后者用来通过由支撑部件支撑以便在所述盘的径向移动的读写头，在盘上记录信息或从盘上再现信息，其特征在于所述信息记录/再现处理程序包括:

驱动处理，用于根据驱动信号将所述读写头在所述盘的径向上移动一段距离;

位置检测处理，用于检测所述读写头在所述盘的径向上的第一位置；以及

控制处理，用于通过以上驱动处理所用的所述驱动信号、利用所述位置检测装置检测到的所述第一位置作为参考位置来控制读写头的移动。

说　明　书

信息记录/再现装置与信息记录/再现方法以及传输媒体

本发明涉及信息记录/再现装置与信息记录/再现方法以及传输媒体。本发明更具体地涉及信息记录/再现装置和适合于通过输出到其步进马达的脉冲数量来控制装置的记录/再现位置的信息记录/再现方法，以及适合于该装置和/或方法使用的传输媒体。

我们已经知道适合于通过用来自光学传感器的激光束照射光盘，在光盘上记录信息或者从光盘再现信息的信息记录/再现装置。

现有的信息记录/再现装置通过找到光学传感器可以访问导入区的参考位置，来用光盘记录信息或再现信息。在信息记录/再现装置中，通过使光学传感器移动到光盘的最内周、借助安装在光盘最内周的检测开关检测光学传感器、继而按预定数量向光盘外周移动光学传感器，来把光学传感器移到所述位置。

对于信息记录/再现装置来说，在确定将由它操作的光盘的类型时，有必要将光学传感器移到预定位置，以免所谓可记录光盘(CD-R)上的信息因激光束所产生的热量而损坏。此外，对于信息记录/再现装置来说，在调整寻迹平衡时，有必要移动光学传感器，以便无误地输出寻迹误差。

但是，因为现有信息记录/再现装置不适合于控制光学传感器的位置，所以每次光学传感器要移到可以访问导入区的参考位置时，都必须首先将光学传感器移到光盘的最内周。于是，每次光学传感器移到光盘的最内周，驱动光学传感器的步进马达不同步并发出碰撞声。这种现有的方法还伴随着从光盘的最内周向其外周移动光学传感器的过程耗时等其它问题。此外，包括光学传感器的信息记录/再现装置发出那种碰撞声也是不“得体”的，用户不会高兴听到这种噪声。

另一方面，有必要将光学传感器移到预定位置，以便确定光盘的类型并调整寻迹平衡。因为现有信息记录/再现装置不适合于控制光学传感器的位置，所以有必要向伺服控制器发出指令，使系统控制器在确定光盘类型和调整寻迹平衡的操作完成之后重新移动光学传感器。这样的过程相当繁琐而且耗时。

鉴于上述问题，所以本发明的目的是提供信息记录/再现装置与信息记录/再现方法，它们适合于快速地将光学传感器移到所用光盘上所需的位置，即使在确定光盘类型和调整寻迹平衡的操作完成之后，也不发出任何碰撞声。本发明的另一个目的是提供适合用于这种装置和/或这种方法的传输媒体。

根据本发明，以上目的通过提供这样的信息记录/再现装置来实现，它包括读写头，它由支撑部件支撑以便在所用光盘的径向移动，从而在光盘上记录信息或者从光盘上再现信息；所述装置适合于通过驱动信号将读写头在光盘的径向移动一段预定距离到第一位置，通过位置检测装置检测读写头的径向第一位置以及通过驱动信号、将位置检测装置所检测到的第一位置作为参考来控制读写头的移动。

因此，根据本发明，只需在装置初始化时将光学传感器移到光盘的最内周一次，以便确定移动光学传感器的参考点。此后，再不需要将光学传感器移到最内周。因此，可以把让光学传感器移到参考位置所需的时间缩到最短，当光学传感器移到光盘的最内周时发出的碰撞声也消除了。

图 1 是根据本发明的信息记录/再现装置的示意的方框图。

图 2 是将光学传感器引到参考位置的处理操作的流程图。

图 3 是确定光盘类型的处理操作的流程图。

图 4 是调整光盘的寻迹平衡的处理操作的流程图。

下面将考虑根据本发明的信息记录/再现装置、信息记录/再现方法和传输媒体、详细描述实现本发明的最佳方式。

如图 1 所示，根据本发明的使用光盘的信息记录/再现装置包括:

轴马达 8，它用来以预定速率驱动光盘 1；光学传感器 5，用于通过以内部激光二极管经由物镜发射的激光束照射，在光盘 1 上记录信息或者从光盘 1 上再现信息；螺杆 9，它这样支撑光学传感器 5、以便使光学传感器 5 可以在光盘 1 的径向上移动；螺线马达 4，用于沿螺杆 9 在光盘的径向上移动光学传感器 5；以及最内周检测开关 7，用于检测位于光盘 1 的最内周的光学传感器 5。螺线马达 4 是步进马达。

使用光盘的信息记录/再现装置还包括：伺服放大器 2，用于从光学传感器 5 输出的信号产生聚焦误差信号和寻迹误差信号；伺服处理器 3，用于根据来自于伺服放大器 2 的聚焦误差信号和寻迹误差信号，产生聚焦控制信号、寻迹控制信号和螺线控制信号；聚焦驱动器 11、寻迹驱动器 12 和螺线驱动器 10，用于分别从来自伺服处理器 3 的聚焦控制信号、寻迹控制信号和螺线控制信号产生聚焦驱动信号、寻迹驱动信号和螺线驱动信号；以及系统控制器 6，用于控制使用光盘的信息记录/再现装置的不同部件。

下面将描述使用光盘的信息记录/再现装置的操作。光学传感器 5 所读取的信号输入到伺服放大器 2。信号被伺服放大器 2 放大，它产生聚焦误差信号和寻迹误差信号。然后所产生的聚焦误差信号和寻迹误差信号输入到伺服处理器 3。伺服处理器 3 处理输入信号，并输出聚焦驱动信号、寻迹驱动信号和螺线驱动信号。从伺服处理器 3 输出的寻迹误差信号也反馈到伺服处理器。

然后，聚焦驱动信号、寻迹驱动信号和螺线驱动信号分别用于驱动：聚焦执行器，用于在聚焦方向上驱动光学传感器的物镜；寻迹执行器，用于在寻迹方向上驱动物镜；以及螺线马达 4，用于沿螺杆 9 在光盘的径向驱动光学传感器。

步进马达 4 通过导杆移动光学传感器 5。光盘 1 被绕轴马达 8 驱动旋转。步进马达 4 的转数取决于驱动信号的脉冲信号。所以，步进马达驱动光学传感器 5 移动一段由驱动信号确定的距离。

最内周检测开关 7 设置在用于通过螺杆 9 在径向驱动光盘 1 的螺

线驱动机构的最内周，它检测位于光盘1的内周的光学传感器5，并且所述检测信号输入到伺服处理器3．系统控制器6通过向伺服处理器3发出指令来实现驱动光学传感器5的操作，该指令可以使光学传感器5向光盘1的内周移动N步，或者向光盘1的外周移动N步，这里N是自然数。

当使用光盘的信息记录/再现装置初始化时，系统控制器6控制光学传感器5，使其移动到光盘1的最内周．这时，伺服处理器3通过用作位置检测装置的最内周检测开关7识别出光学传感器5位于光盘1的最内周，并停止螺线马达4，使光学传感器5准确地定位在那里。这样，最内周检测开关7用作位置检测装置，用于检测光学传感器5位于确定光学传感器5在光盘1的径向上最内的可移动极限的第一位置。

光盘1具有位于其内周附近的导入区．在光学传感器5起初访问光盘1之前，它必须移到参考位置，从这里它可以访问导入区。所以，光学传感器5可以从其处访问导入区的第二位置称作参考位置。

伺服处理器3通过输出脉冲信号到螺线马达4来驱动螺线马达4．所以，伺服处理器3可以通过计算脉冲信号的脉冲数确定光学传感器5的位置。然后，系统控制器6可以通过从伺服处理器3读取关于光学传感器5的位置信息来识别光学传感器的位置。

因为系统控制器6如上所述识别光学传感器5的第一位置，所以它可以将光学传感器5移到第二位置或参考位置，而不用先将它移到光盘1的最内周．更具体地说，如从图2的流程图可见，系统控制器6在步骤S11从伺服处理器3读取光学传感器5的当前位置信息。然后，系统控制器6在步骤S12以计算的方式确定光学传感器5的当前位置与参考位置之间的距离．此后，系统控制器6向伺服处理器3发出指令，该指令使光学传感器5移动预定距离．因此，系统控制器6可以将光学传感器5移到参考位置，不必先将它移到光盘1的最内周．

使用光盘1的信息记录/再现装置必须确定光盘1的类型是CD还

是DVD．确定光盘类型的操作称作光盘类型确定．光盘类型确定操作通过图3的流程图所示的以下过程来实现。参考图3，系统控制器3首先在步骤S21控制伺服处理器3存储光学传感器5的最新位置。当确定光盘类型时，伺服处理器3被用来代替上述最内周检测开关7，作为检测光学传感器5在光盘1的径向上的第一位置或当前位置的装置．

然后，在步骤S22，系统控制器6向伺服处理器3发出指令，使后者移动光学传感器5．然后，在步骤S23，系统控制器6接通光学传感器5上所备的激光二极管，使之在光盘1上进行聚焦搜索操作，以便确定光盘1的类型。然后，在步骤S24，系统控制器6向伺服处理器3发出指令，使后者将光学传感器5移回聚焦搜索操作之前的位置。

如果确定步骤S23的聚焦搜索操作的结果是光盘1为可记录CD-R，存储在激光束照射的位置上信息可因热力损坏。因此，系统控制器6通过螺线传动机构驱动光学传感器5退回，所述螺线传动机构包括螺线马达7和螺杆9，且适合于在光盘1的径向上移动光学传感器5．利用这种装置，照射光盘1的激光束所产生的热量可以被分散开，防止光盘1上的任何信息因热力而损坏。

以这样一种方式向寻迹控制信号施加偏置电压的调整操作称为寻迹平衡调整，就是在聚焦伺服被激活、从光学传感器5发射的激光束聚焦在信息记录面的情况下，形成在光盘的信息记录面的、表示激光束的聚焦点与目标记录轨道错位的寻迹误差信号可以摆动离开中心电压。

为了寻迹平衡调节，有必要通过螺线传动机构以这样的方式移动光学传感器5，即，即使光盘是无偏心盘（eccentricity-free disk），也会无误地产生寻迹误差信号．寻迹平衡调整操作通过图4的流程图所示的以下过程来实现．参考图4，系统控制器3首先在步骤S31控制伺服控制器3，使后者存储光学传感器5的位置。当调整寻迹平衡

时，伺服处理器 3 用来代替上述最内周检测开关 7，作为用来如上所述参考确定光盘类型的操作、检测光学传感器 5 在光盘 1 的径向的第一位置或当前位置的装置。

然后，在步骤 S32，系统控制器 6 向伺服处理器 3 发出指令，使后者移动光学传感器 5。然后，在步骤 S33，系统控制器 6 控制寻迹平衡调整操作适当地进行。然后，在步骤 S34，系统控制器 6 向伺服处理器 3 发出指令，使后者将光学传感器 5 移到寻迹平衡调整位置。

下面将描述根据本发明的传输媒体的实施例。传输记录媒体是适合于传输信息记录/再现处理程序的媒体，该信息记录/再现处理程序用于通过由支撑部件这样支撑的、以便至少可以在光盘径向上自由移动的读写头，在光盘上记录信息或者从光盘上再现信息，所述信息记录/再现处理程序包括：用于在读写头的径向上将读写头移动由驱动信号确定的距离的驱动处理；用于检测在光盘径向上读写头的第一位置的位置检测处理；以及用于通过以上驱动处理所用的驱动信号、采用由位置检测处理所检测的第一位置作为参考位置，来控制读写头的移动的控制处理。

传输媒体可以是诸如 CD-ROM 磁盘或固体存储器的记录媒体，或者诸如网络或通信卫星的通信媒体。

如上所述，本发明的最佳实施例包括螺线传动机构，它由步进马达 4 驱动，并通过输出到步进马达的脉冲信号的数量控制光学传感器 5 的位置。

因此，所述实施例利用所获得的关于当前位置信息，以计算的方式确定光学传感器 5 的当前位置与光盘 1 的最内周之间的距离，并将光学传感器 5 停在导入区中的一个位置上。

所述实施例还检测光学传感器 5 开始移动时的位置，并且，光学传感器 5 根据所述确定操作或调整操作中止时到达的位置检测移动的距离。然后，所述实施例通过将其反向移动所检测的距离而将光学传感器 5 移回原位。

应该明白，所述实施例也可用于利用由步进马达 4 驱动的螺线传动机构，并计算从步进马达 4 输出的脉冲信号的脉冲数量，来将光学传感器 5 移到随意选取的位置。

当信息记录/再现装置的读写头在以上实施例中是光学传感器 5 时，读写头实际上包括在光学传感器 5 中所备的物镜。因为激光束聚焦在光盘 1 上的位置是由光学传感器 5 和物镜限定的，所以信息记录/再现装置在控制之下移动位置。

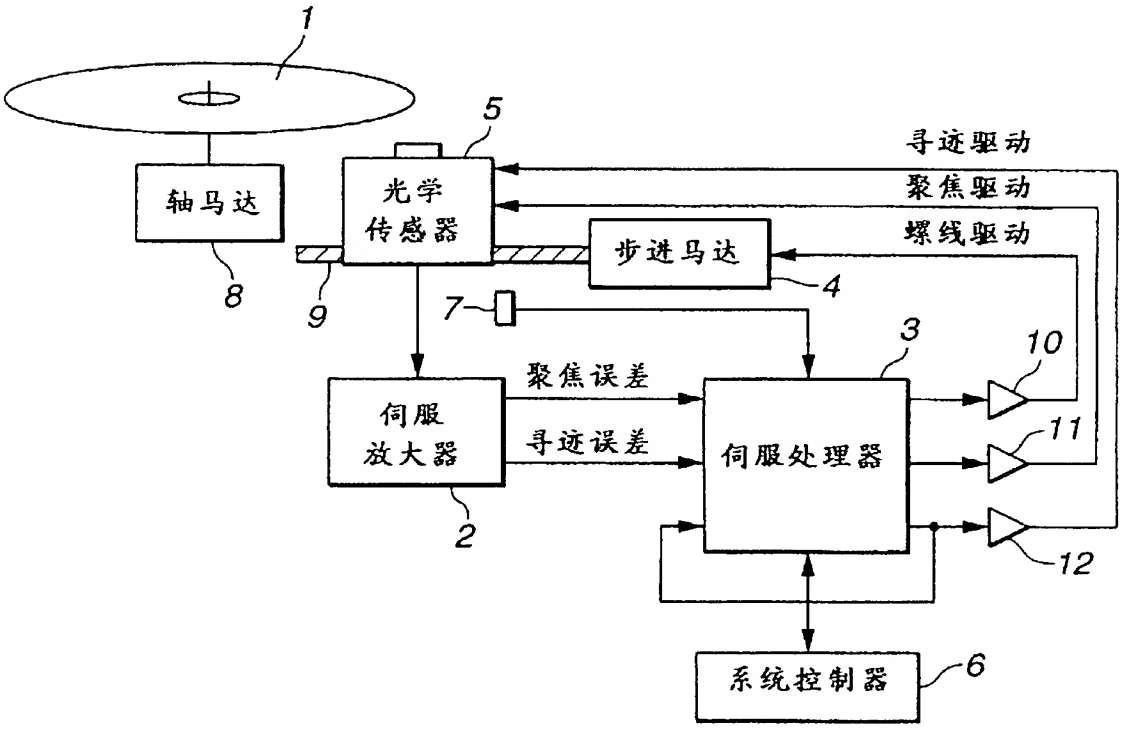
1
5
寻迹驱动
聚焦驱动
螺线驱动
轴马达
光学
传感器
步进马达
8
9
4
7
3
10
聚焦误差
伺服
放大器
寻迹误差
伺服处理器
11
2
12
系统控制器
6

图 1

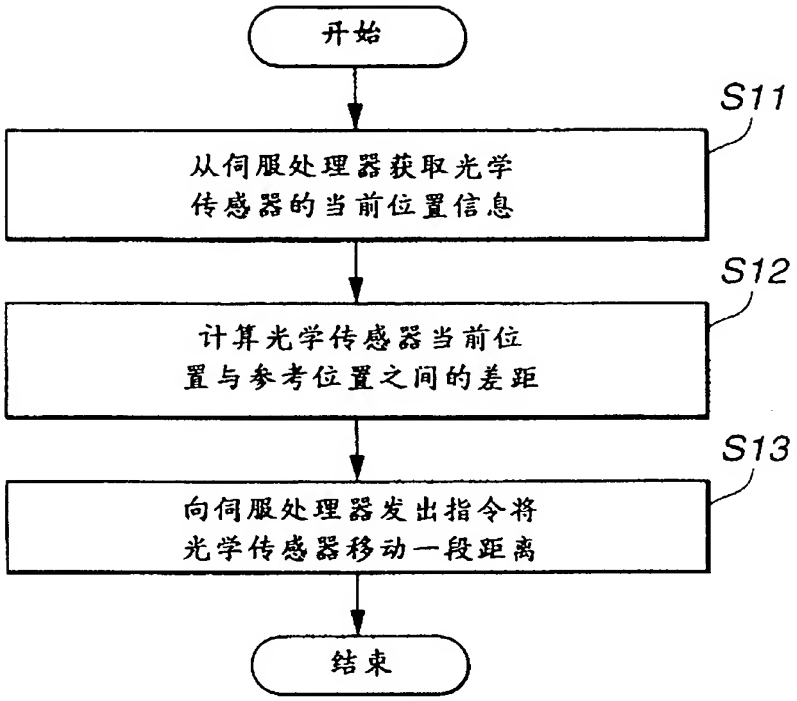
开始
S11
从伺服处理器获取光学传感器的当前位置信息
S12
计算光学传感器当前位置与参考位置之间的差距
S13
向伺服处理器发出指令将光学传感器移动一段距离
结束

图 2

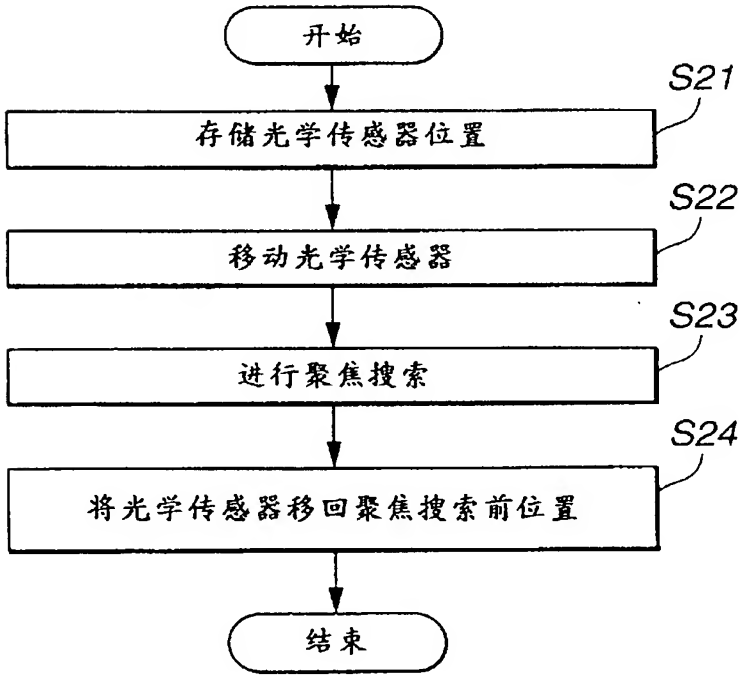
开始
S21
存储光学传感器位置
S22
移动光学传感器
S23
进行聚焦搜索
S24
将光学传感器移回聚焦搜索前位置
结束

图 3

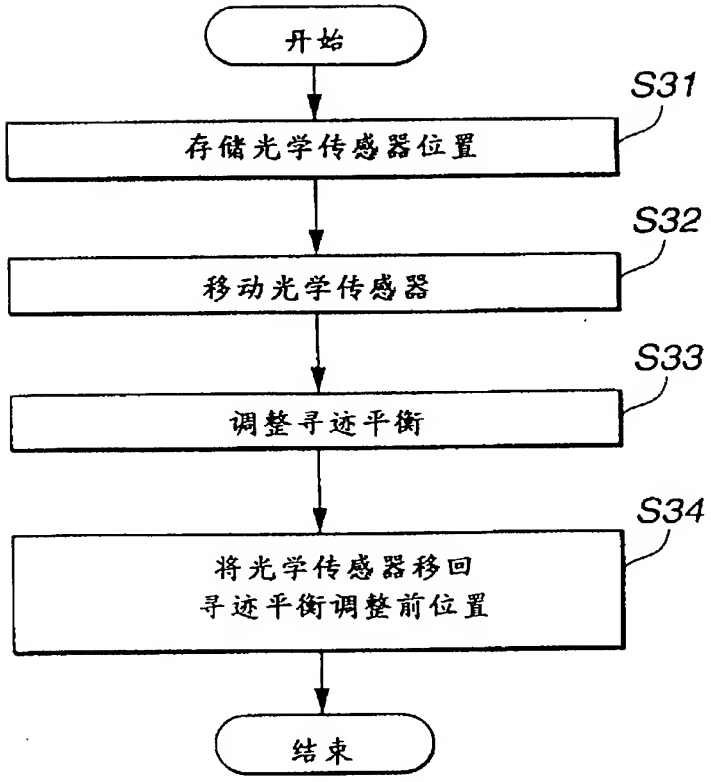
开始
S31
存储光学传感器位置
S32
移动光学传感器
S33
调整寻迹平衡
S34
将光学传感器移回
寻迹平衡调整前位置
结束

图 4